Precision Timing-Based Shutter-Enabled System for Frequency Inference from Partial Waveforms for Prevention of Antenna Deafening

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Introduction

The problem of antenna deafening; defined as an antenna's inability to convert photons associated with radio signals into electrons due to the over-saturation of the antenna with a negative electrical charge; is one which, if it could be overcome, would enable extant signal authentication mechanisms to be used to authenticate transmissions.

Abstract

If antennae could be exposed to electromagnetism only in short bursts by using a shutter to limit the exposure of the antenna to ambient electromagnetism to a length of time equal to only a portion of the time it takes for a single wave of EM to pass through the antenna and if the frequency of that EM could nonetheless be successfully inferred despite the capture of only a small portion of the wave, the antenna would be able to recover from any electrical loading and could build a picture of the ambient EM environment through a series of snapshots rather than through one continuous "exposure." This shutter could be readily constructed by using materials which entirely block electromagnetism but which permit it only when electrified, "opening" the shutter for only about about 10 picoseconds at a time.

I propose that this ultra-fast radio shutter be used toward this end. Such a shutter would be capable of permitting only several thousands of photons to enter an antenna mechanism which leads to a planar conductive material such as graphene. Two precision timing measurements are made, one of which registers inception of current in the primary antenna and another which measures the range of times at which the last of the current generated by the antenna reaches the secondary antenna.

In accordance with the principles of frequency-associated path deviation, electrical current of a higher frequency will have a greater tendency to follow more circuitous paths. Some portion of higher-frequency current will follow a straight line, but the higher the frequency, the more of the current will follow a deviated path and the greater will be the maximum degree of the deviation. This is, fundamentally, the reason why high-voltage electricity can produce arcing at greater distances. The maximum deviation will always precisely correlate with the frequency and a precision chronometer can be used to infer the extent of that deviation. Within a planar graphene layer, this effect can be exploited to allow for the inference of frequency using only a small sampling of an EM wave.

Therefore, by taking two precision measurements; one, of the time of arrival of clusters of electrons associated with partial waveforms and another with

their time of arrival at a secondary detector; we may infer the frequency of the EM which produced it by inferring the voltage of the current it generated.

Conclusion

Although other signal authentication steps would still be required, this approach would eliminate the problem of antenna deafening in a manner which is affordable and which would not require substantial re-design of extant radio systems as this mechanism could be modular in nature.